A SPECTRAL METHOD FOR CALIBRATING A MULTI-AXIS ACCELEROMETER DEVICE

ABSTRACT OF THE DISCLOSURE

A method for simultaneously determining respective scale factors and alignment angles of a multi-axis accelerometer device for measuring acceleration. To measure the scale factors, the multi-axis accelerometer device to be calibrated is mounted on a turntable. The turntable has a tilt angle with respect to a vertical axis defined by the local gravity vector. The turntable is used to spin the multi-axis accelerometer device around an axis of rotation at an angular velocity such that the multiple sensitive axes of the accelerometer device experience a time varying component of the local gravity vector. The respective outputs of the multiple sensitive axes of the accelerometer device are recorded as the device experiences the time varying component of the local gravity vector. The multi-axis accelerometer device is mounted on the turntable in two more orthogonal orientations, and the rotation and data recording procedure is repeated. The angular velocity can be constant during the logging. Additionally, the predicted output of an ideal accelerometer on the turntable is generated, wherein the predicted output is based on the tilt angle of the turntable and the angular velocity of the turntable and on the value of gravitational acceleration at the location of calibration. The data recorded with the accelerometer device mounted in the three orientations are combined with the predicted output, to obtain the scale factors and alignment angles of the multi-axis accelerometer device.